

# Measles outbreak

## Tomsk Region

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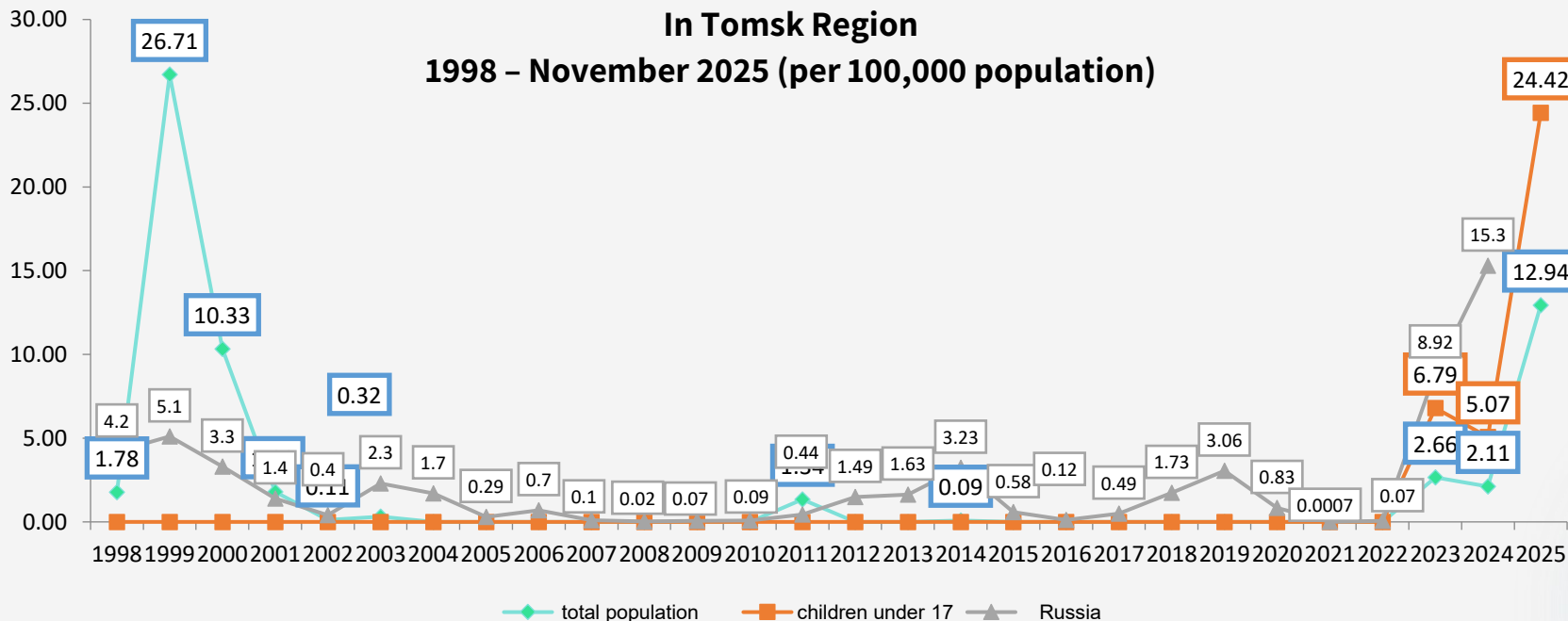
**Ms. Julia ERMOLAEVA**

Chief Infection Specialist, Tomsk Region Health Department Ph.D.  
of Medical Sciences Assistant Professor in the Department of  
Pediatrics, Siberian State Medical University (Russia)

# Morbidity of measles

Tomsk Region, Russia

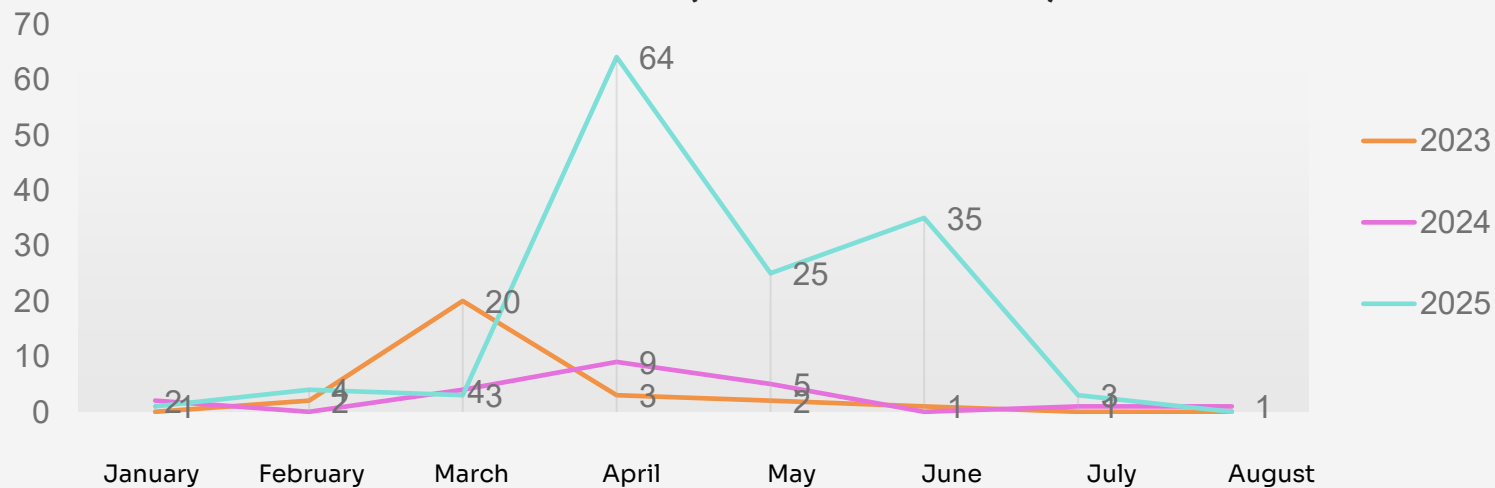
**Dynamics of measles incidence  
In Tomsk Region  
1998 – November 2025 (per 100,000 population)**



# Morbidity of measles

Tomsk Region, Russia

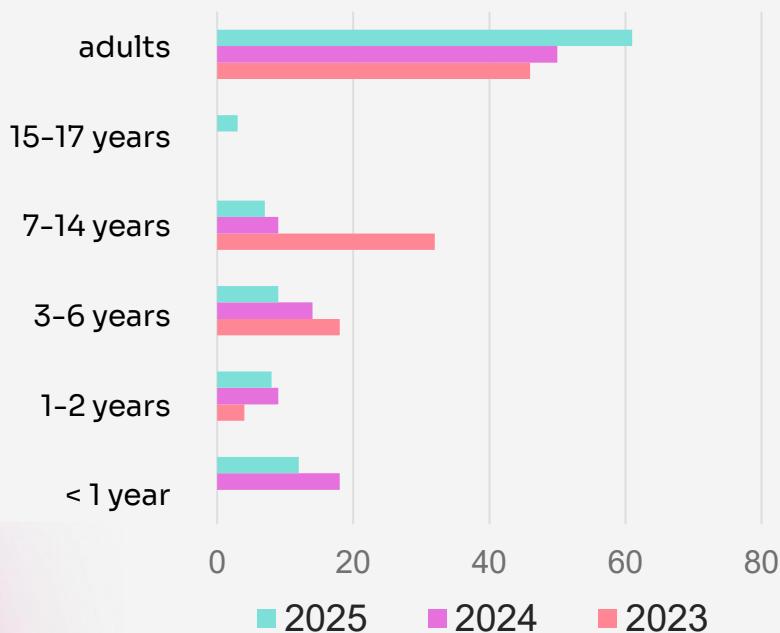
**Intra-annual dynamics of measles incidence  
2023–2025 (absolute numbers)**



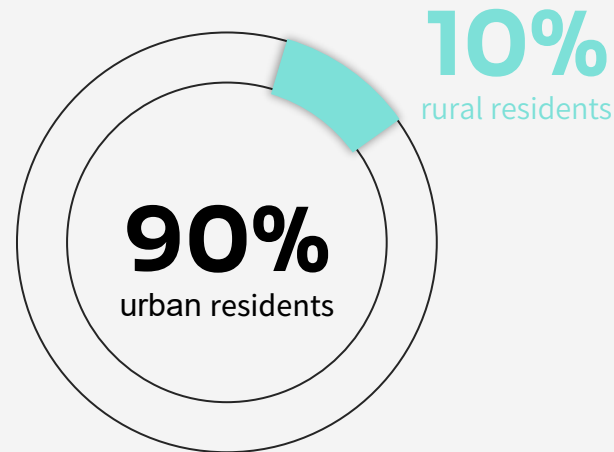
# Measles Outbreak Analysis

Tomsk Region, Russia

### Age structure of confirmed measles cases



### Distribution of measles cases by area of residence

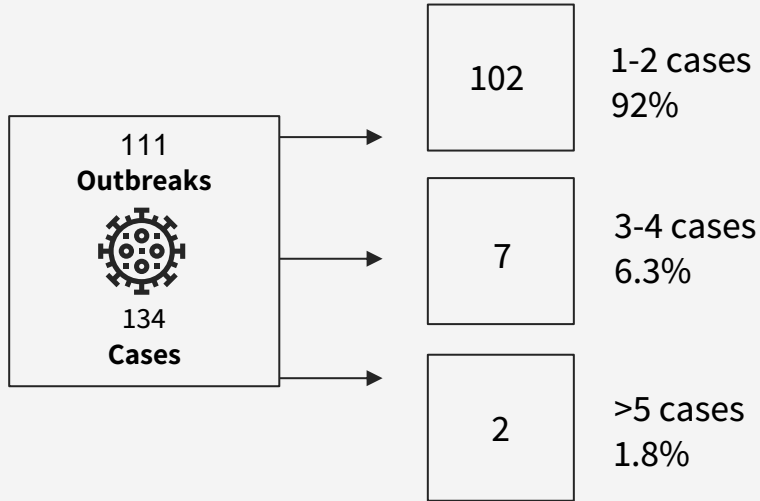


# Measles Incidence Analysis, 2023–2025

Year	Number of cases (abs./ per 100,000)	Including Children (abs./ per 100,000)	By Territory (number of cases)Tips	Case Classification	Date of first case	Date of last case
2025 10 months	135 24.45	53 6.79	Tomsk City (119) 88% Tomsk District (13) Shegarsky District (1) Asinovsky District (2)	Imported – 1 case (0.7%) Tajikistan (1) Introduced – 2 cases (1.3%) (Chechen Republic, Novosibirsk Region) Local – 132 cases (62.8%), incl. 2 cases linked to introduced, 1 case linked to imported	30.01.2025	26.06.2025
2024	22 2.09	11 4.98	Strezhevoy City (1) Tomsk City (17) Tomsk District (4)	Imported – 2 cases (9.1%) (Sri Lanka – 1, Kazakhstan – 1) Introduced – 5 cases (22.7%) (Nizhnevartovsk, Sochi, Moscow – 2) Local – 15 cases (62.8%)	10.01.2024	04.08.2024
2023	28 2.66	15 6.79	Tomsk City	Imported – 3 cases (10.7%) (Thailand – 2, Tajikistan – 1) Introduced – 3 cases (10.7%) (Novosibirsk – 1, Moscow – 1, Republic of Ingushetia – 1), Local – 22 cases (78.6%)	15.02.2023	26.06.2023

# Characteristics of Measles Outbreaks

## Measles Outbreaks



## Socially Significant Outbreaks by Setting



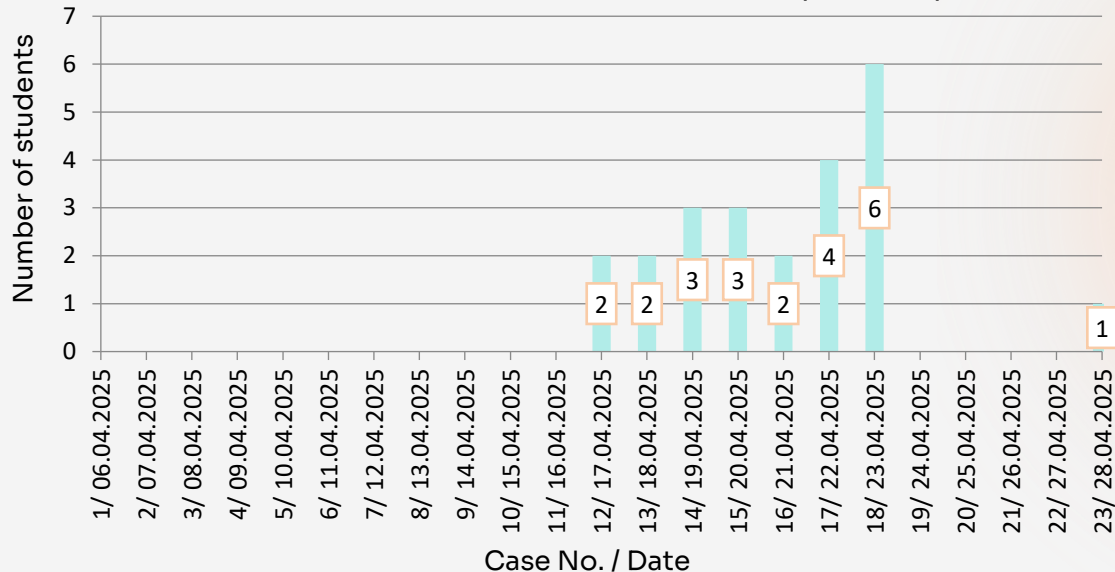
15

42

# Outbreaks in Higher Education Institutions

**Outbreak period:**  
April 19 – April 24, 2025

23 Students  
(1 Dormitory)



2/ 07.04.2025  
Citizen of the People's Republic of China  
diagnosed with Stevens–Johnson syndrome

## Symptoms:

Temp. 37.7°C (99.9°F)

Rash on face and back

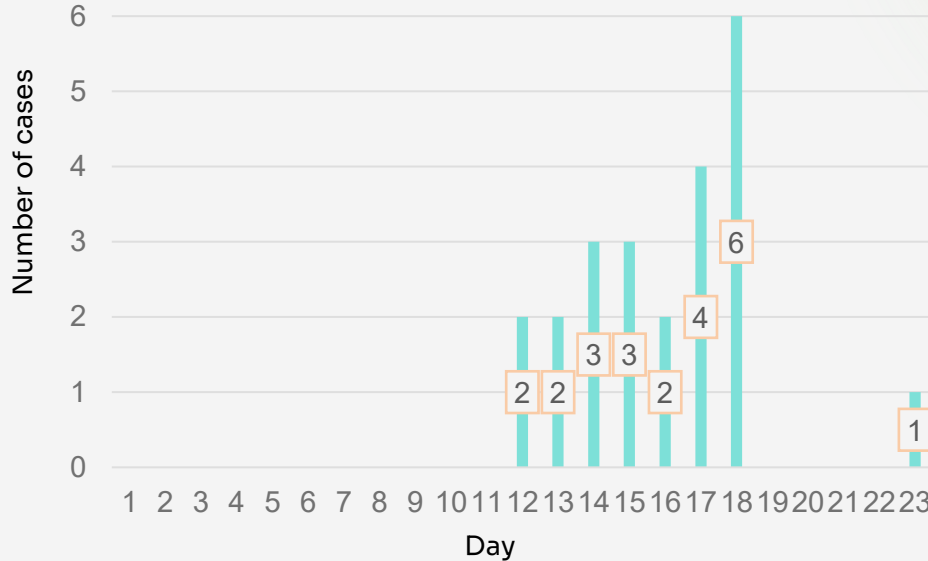
Papules in the mouth (oral papules)

Cough with sputum (productive cough)

# Outbreaks in Higher Education Institutions

## Causes of Outbreak Formation in Healthcare Facilities and Educational Institutions:

- Late seeking of medical care (on days 6—7 after disease onset)
- Concealment of contacts
- Delayed implementation of anti-epidemic measures
- Presence of unvaccinated individuals against measles among contacts
- Delayed diagnosis in patients with clinical manifestations of measles; differential diagnosis performed without consideration of epidemiological history and clinical features
- Location of healthcare facilities in non-standard buildings
- Non-compliance with sanitary and epidemiological regulations in hospitals (admission to shared wards due to low percentage of isolation rooms, lack of control over patient movement within the hospital, etc.)
- Difficulties in medical follow-up of contacts in outbreak settings

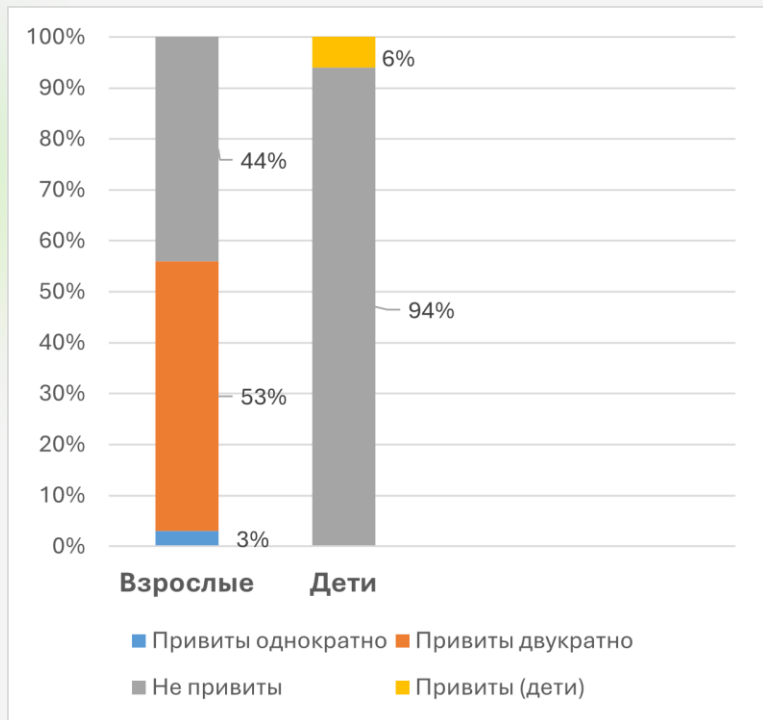


23 Students  
(1 Dormitory)

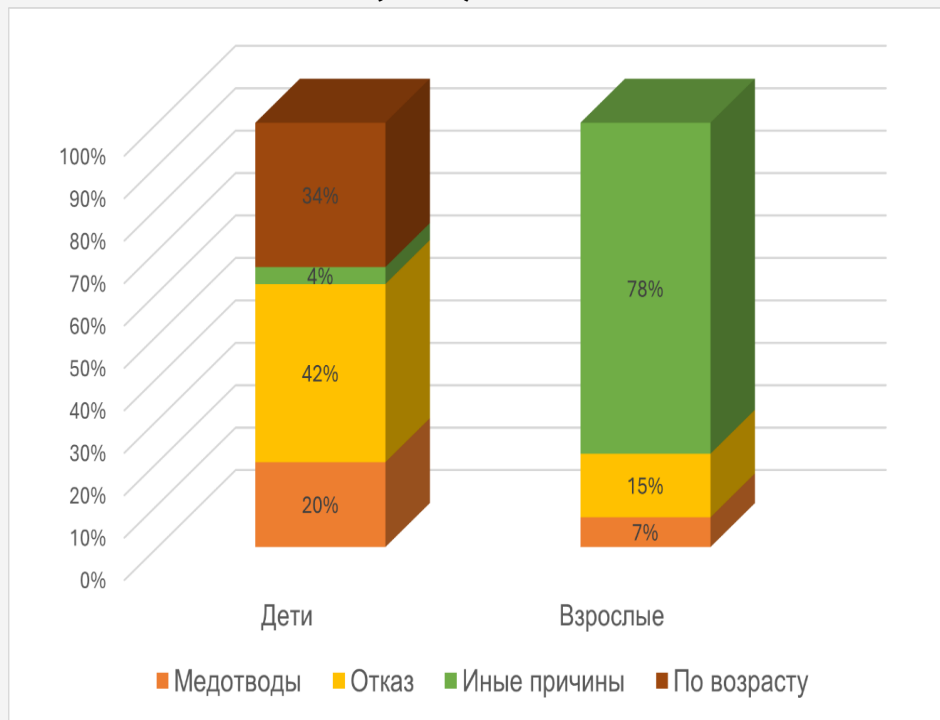
# Analysis of Vaccination Status Among Measles Cases

Tomsk Region, Russia

## Analysis of Vaccination Status Among Cases, (%)

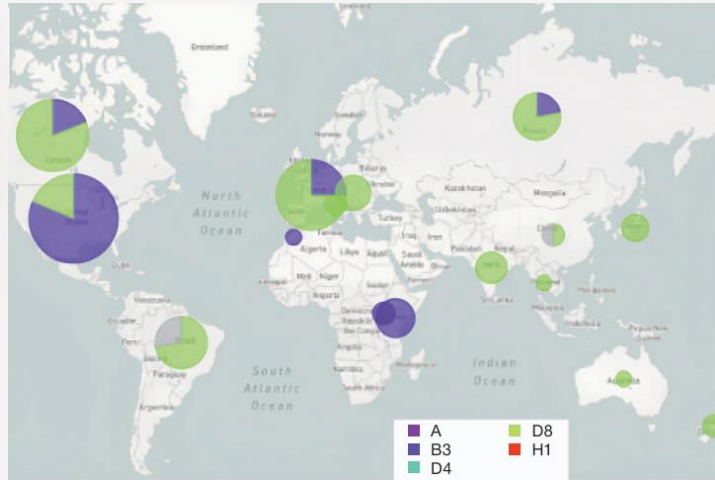


## Reasons for Non-Vaccination Among Affected Children and Adults (2025)



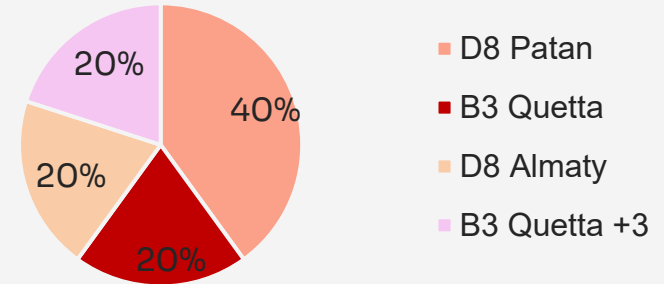
# Epidemiological Features of the Measles Pathogen

## Global Distribution of Known Measles Virus Genotypes<sup>1</sup>

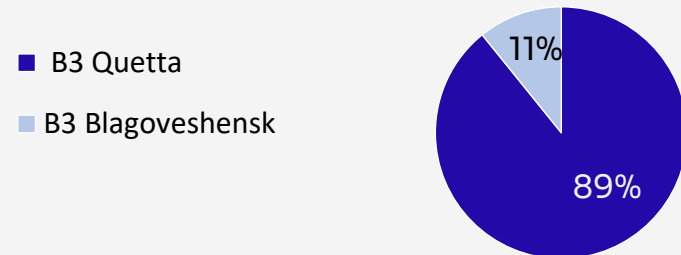


Chernyaeva E.N., Morozov K.V., Mashvay A.D., Guslykhova M.S., Nekrasov A.Y., Stetsenko I.F., Nosova A.O., Kurskaya O.G., Shestopalov A.M., Shipulin G.A. Molecular genetic characterization and phylogenetic analysis of Russian and foreign measles virus variants, 2020–2024. *Medicine of Extreme Situations*. 2024. No. 3. URL: <https://cyberleninka.ru/article/n/molekulyarno-geneticheskaya-harakteristika-i-filogeneticheskij-analiz-rossijskih-i-zarubezhnyh-variantov-virusa-kori-2020-2024-tg> (accessed: 08.12.2025)

## Genotype Distribution of Measles Virus in Clinical Samples from Cases, 2024<sup>2</sup>



## Genotype Distribution of Measles Virus in Clinical Samples from Cases, 2025<sup>2</sup>



# Current Clinical Course of Measles

Tomsk Region, Russia

Clinical course of measles based on medical records  
of hospitalized patients with measles (n=135)

Typical measles – 100%		
Mild form	Moderate form	Severe form
11 (11%)	108 (80.4%)	16 (11.8%)

No atypical forms of measles were registered among  
patients

# Clinical Presentation of Measles

Symptom		Children (n=53)	Adults (n=82)
Cough	Dry, %	69.4%	32.1%
	Wet, %	12.2%	3.5%
Sore throat		14.3%	30%
Weakness		57.1%	34%
Vomiting		18.4%	51%
Diarrhea		36.7%	5%
Rhinitis		40.8%	10%
Headache		8.2%	34%
Conjunctivitis		55.1%	7.1%
Scleritis		20.4%	5%
Belsky-Filatov-Koplik spots		40.8%	7.1%
Enanthem of the soft and hard palate		6.1%	7.1%
Erosions on the buccal mucosa		7.5%	30%

# Structure of Measles Complications

Type of complication	Children under 18 (n=53)	Adult patients (n=82)	Total: (N=135)
Pneumonia	10 (21.2%)	7 (12.7%)	17 (16.7%)
Acute laryngotracheitis	1 (2%)		1 (0.98%)
Microhematuria		1 (0.2%)	1 (0.98%)
Acute keratoconjunctivitis		1 (0.2%)	1 (0.98%)
Acute reactive hepatitis	1 (2%)	4 (7.6%)	5 (4.9%)
Intestinal manifestations	1 (2%)		1 (0.98%)
Acute sinusitis		1 (0.2%)	1 (0.98%)
Acute respiratory failure (ARF)	2 (4%)	4 (7.6%)	6 (5%)
Secondary cardiomyopathy of toxic-infectious origin	3 (6%)		3 (2.9%)
Candidal stomatitis	2 (4%)		2 (2%)
Acute otitis media	2 (4%)		2 (2%)
Lacunar tonsillitis	3 (6%)		3 (2.9%)
<b>TOTAL:</b>	<b>28 (59.6%)</b>	<b>13 (24%)</b>	<b>41 (40.2%)</b>

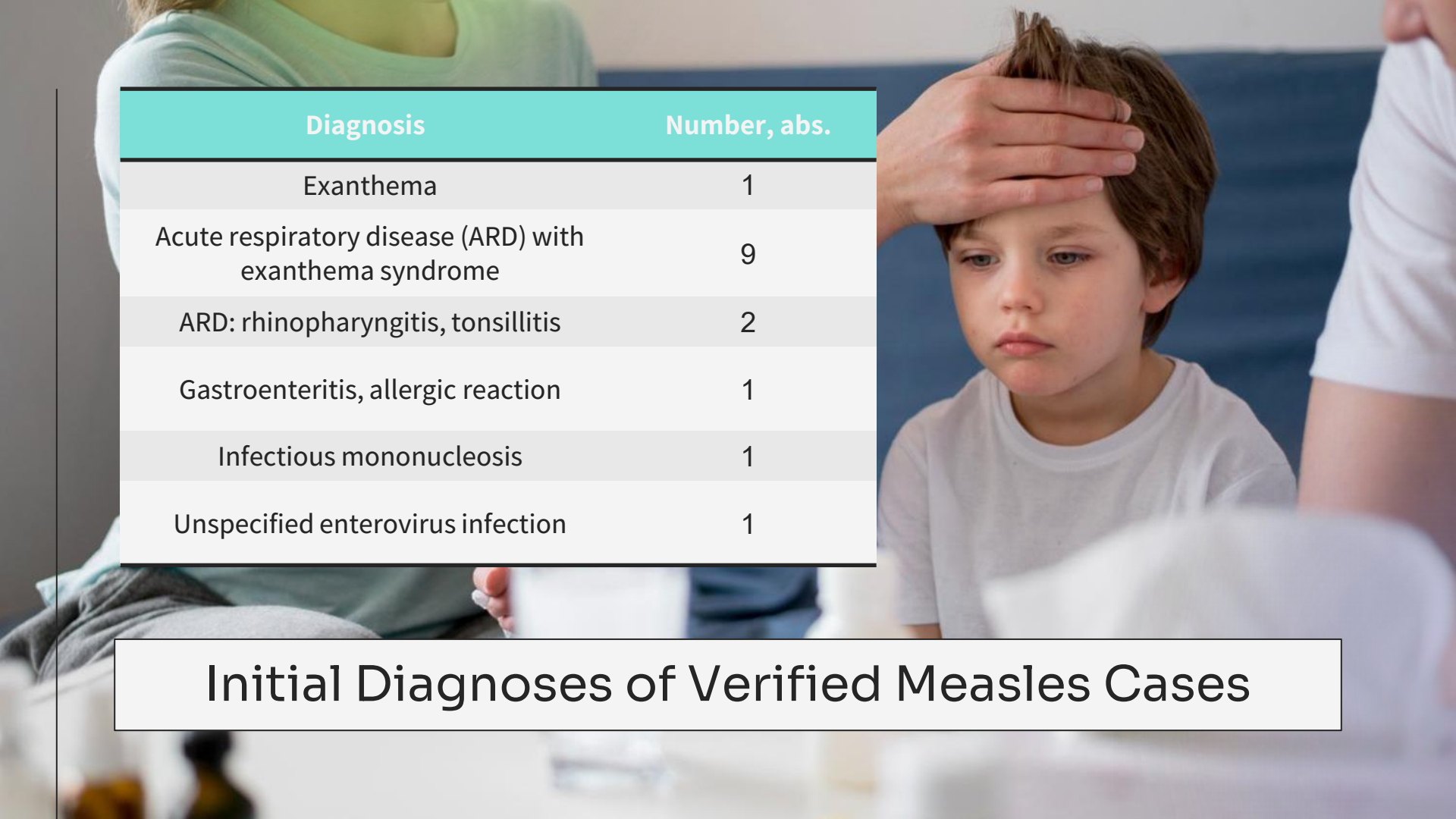
# Active Surveillance for Measles and Rubella Among Patients with Maculopapular Rash and Fever, and Suspected Measles

## DATA ON BLOOD SPECIMENS SUBMITTED FROM PATIENTS WITH SUSPECTED MEASLES FOR 2023, 2024, AND 10 MONTHS OF 2025

Total submitted to the Regional Center (cumulative total)			Number of positive results		
2025	2024	2023	2025	2024	2023
181	36	70	123	20	21

## DATA ON BLOOD SPECIMENS SUBMITTED FROM PATIENTS WITH EXANTHEMA AND FEVER FOR MEASLES AND RUBELLA TESTING FOR 2023, 2024, AND 10 MONTHS OF 2025

Total submitted to the Regional Center (cumulative total)			Number of positive results		
2025	2024	2023	2025	2024	2023
52	16	72	15!!!	2	7



Diagnosis	Number, abs.
Exanthema	1
Acute respiratory disease (ARD) with exanthema syndrome	9
ARD: rhinopharyngitis, tonsillitis	2
Gastroenteritis, allergic reaction	1
Infectious mononucleosis	1
Unspecified enterovirus infection	1

## Initial Diagnoses of Verified Measles Cases

# Implemented Anti-Epidemic Measures

1. 550 orders issued for additional anti-epidemic measures in outbreak foci.
2. Upon detection of the first measles cases, higher education institutions transitioned to distance learning.
3. "Catch-up" immunization (subcutaneous immunization) against measles was carried out in Tomsk Region.
4. In 3 populated areas of Tomsk District where measles cases were registered, "catch-up" immunization was organized among the population. A total of 86 people were vaccinated, including 38 children.
5. Due to the registration of measles cases among vaccinated staff of infectious disease departments, additional serological testing was organized. Testing in two infectious disease hospitals revealed 15 seronegative individuals among the vaccinated staff, accounting for 12% of those tested. All seronegative individuals were subsequently vaccinated.
6. The epidemiological situation regarding measles was reviewed at a staff meeting with the Governor and at a meeting of the Regional Sanitary-Anti-Epidemic Commission (SPEK) (2 meetings). Relevant instructions were given.
7. A meeting was held at the Tomsk Region Department of Health on "The epidemiological situation regarding measles in Tomsk Region and response measures in outbreak foci."
8. A meeting was held with chief physicians of medical facilities regarding response measures in measles outbreak foci, including the organization of additional training for healthcare workers.

# Analysis of Vaccination According to Epidemic Indications

Years	Total contacts in outbreak foci (abs.)	Of which subject to vaccination		Received specific prophylaxis			Not vaccinated (abs.)		Reasons for non-vaccination (Children)				Reasons for non-vaccination (Adults)		
		children	adults	Vaccinated according to epidemic indications		administered $\gamma$ -globulin (abs.)	children	adults	Medical exemption	Refusal	Other	Age	Medical exemption	Refusal	Other
				total	including within the first 72 hours										
2025	10423	159 1.5%	1343 12.9%	1257 83.7%	1195 79.6%	5	54 33.9%	191 14.2%	12 22.2%	17 31.5%	4 7.4%	21 38/9%	60 31/4%	87 45.5%	44 23.1%
2026	3428	360 8.7%	277 8.1%	526 82.6%	516 81.0%	2	68 18.8%	43 15.5%	5 7.4%	28 41.20%	35 51.5%	1 1.5%	8 18/6%	21 48/8%	14 32.6%

# Serological Monitoring of Measles Immunity Levels in 2020 – 10 months of 2025 (in indicator groups)

Indicator Groups	Number Examined						% Seronegative					
	2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
3-4 years	100	69	121	89	102	95	13.0	15.9	4.9	10.0	6.9	9.5
9-10 years	99	79	80	97	102	91	9.0	17.7	12.5	9.3	12.7	6.6
16-17 years	199	100	108	106	82	104	24.6	42.0	29.6	18.8	25.6	6.7
20-24 years	226	6	167	35	36	36	23.4	50.0	23.3	40.0	25.0	27.8
25-29	103	20	137	56	41	56	8.7	45.0	29.9	26.7	31.7	32.1
30-35	140	16	55	40	49	46	22.1	43.5	34.5	27.5	20.4	21.7
36-39	176	19	49	51	38	52	11.3	21.0	20.4	19.6	15.7	11.5
40-49	127	15	87	85	118	93	12.5	6.7	19.5	14.1	11.8	15.1
Total	1300	1170	804	559	568	573	17.8	28.1	21.6	17.8	16.4	13.9

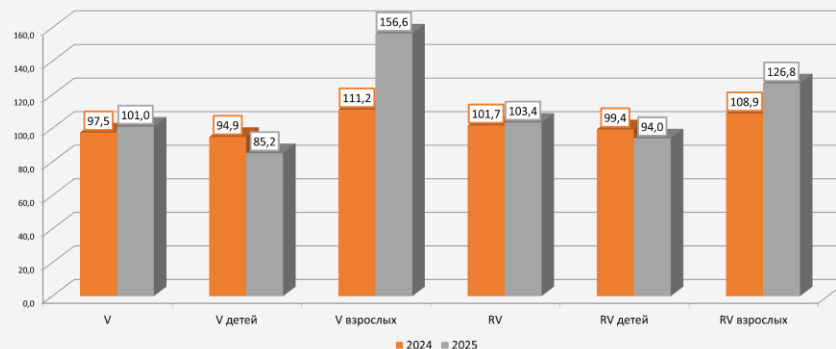
Source: State Report "On the sanitary and epidemiological welfare of the population in the Tomsk Region in 2023": official website – Tomsk, 2024. URL: [https://70.rospotrebnadzor.ru/documents/regional/gos\\_doklad](https://70.rospotrebnadzor.ru/documents/regional/gos_doklad) (accessed 01.12.2025)

# Measles Vaccination Coverage in Mandated Age Groups

2011-2024 (%)

Vaccination Coverage	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
CHILDREN AGED 12 MONTHS	96.6	96.9	97.5	96.9	97	97	97.1	97	97	97	96.7	96.7	52.6	96.0
CHILDREN AGED 6 YEARS	97.5	99.3	97.5	97.8	97.8	98	98	97.2	98.2	98.8	98.6	96.7	92,5 (R-55.3)	98.4 (R-95.2)
ADULTS AGED 18-35 YEARS	99	97.5	97.9	98.2	98.4	98.7	96.6	98.3	98	97.4	95.3	98.3	98.8	98.8

**Timeliness of Measles Vaccination by 24 Months of Age, 2011-2023**



State Report "On the sanitary and epidemiological welfare of the population in the Tomsk Region in 2023": official website. – Tomsk, 2024. – URL: [https://70.rospotrebnadzor.ru/documents/regional/gos\\_doklad](https://70.rospotrebnadzor.ru/documents/regional/gos_doklad) (accessed 01.12.2025)

# Conclusions

1. During the 2025 outbreak in Tomsk Region, a single genotype **B3** was circulating; the **index case (patient zero)** was not identified.
2. Among confirmed measles cases, all patients demonstrated a **typical clinical picture**, predominantly of **moderate severity**. **Diarrhea** was more frequently observed among children, while adult patients exhibited more pronounced **febrile responses**, symptoms of **general intoxication**, and **liver involvement (cytolysis syndrome)**.
3. The main cause of the increased incidence was the **accumulation of a significant susceptible share of population**, both among children (due to **vaccination refusals** and **medical exemptions**) and among adults (due to **waning immunity** and **gaps in revaccination**).
4. **Active surveillance** for measles and rubella among patients with **maculopapular rash and fever**, as well as those with suspected measles, highlighted the need to increase **physician awareness** regarding measles infection.
5. Prompt **anti-epidemic measures** enabled the **localization of infection foci** and prevented further spread of measles. To prevent future outbreaks, a **comprehensive strategy** is required, including **strict adherence to the vaccination schedule**, **active immunization of susceptible adults**, and **strengthened epidemiological control in infection foci**.

**Thank you for  
your  
attention!**

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**Do you have any questions?  
Ms. Julia ERMOLAEVA**